

DISPOSABLE WEARING ARTICLE

RELATED APPLICATIONS

The present application is based on, and claims priority
5 from, Japanese Application Serial Number 2002-311678, filed
October 25, 2002, the disclosure of which is hereby incorporated
by reference herein in its entirety

BACKGROUND OF THE INVENTION

10 The present invention relates to a disposable wearing
article such as a disposable diaper for personal care of bodily
discharges.

Japanese Utility Model Publication No. 2523711B
discloses a disposable diaper provided in a crotch region with
15 a feces receiving concavity and formed around such concavity
with a protrusion.

The disposable diaper disclosed in the above-cited
Publication is more complicated than a diaper provided with no
concavity to receive feces and generally apt to require the
20 correspondingly higher unit cost of the product. From the other
viewpoint, this diaper may lead to wasteful use of resources
because, even when only the zone of the diaper surrounded by
the protrusion has been contaminated with bodily discharges,

the remaining zone of the diaper is often substantially free from contamination and the diaper must be thrown away because of such restricted contamination.

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SUMMARY OF THE INVENTION

It is an object of the present invention to improve the disposable diaper provided with the concavity adapted to receive bodily discharges such as feces so that the unit cost of such article can be substantially reduced.

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According to the present invention, there is provided a disposable wearing article having a front waist region, a rear waist region and a crotch region extending between the waist regions, each having an inner surface facing a wearer's body and an outer surface facing away from the wearer's body, and
15 the crotch region being formed in a transversely middle zone thereof on the inner surface with a protrusion surrounding at least one of an anus and a urethral of the wearer.

The present invention further comprises a holder member having the front waist region, the rear waist regions and the
20 crotch region; and a bodily discharge receiving member detachably held by the holder member; wherein the crotch region is provided in a transversely middle zone thereof with a through-hole extending between the inner surface and the outer

surface, and the receiving member comprises an annular portion adapted to be detachably inserted from a side of the outer surface of the holder member into the through-hole so as to form the protrusion and a bursiform portion lying at a side of the outer surface of the holder member and joined to an outer periphery of the annular portion so that bodily discharges flow through the annular portion into the bursiform portion and the receiving member is held by the holder member by detachably joining the receiving member to the holder member around the through-hole.

The present invention includes the following embodiments.

The lateral portions of the holder member in the front and rear waist regions are releasably engaged with each other to define a waist-hole and a pair of leg-holes.

The lateral portions of the holder member in the front and rear waist regions are permanently joined together to define a waist-hole and a pair of the leg-holes.

The protrusion comprises flexible and elastically compressive foamed plastic.

The bursiform portion is formed by a liquid-impervious sheet.

The holder member is washable and reusable.

The holder member is elastically stretchable.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view showing a diaper as put on
5 a wearer's body;

Fig. 2 is a partially cutaway plan view showing the diaper
of Fig. 1;

Fig. 3 is a sectional view taken along a line III-III in
Fig. 2;

10 Fig. 4 is a sectional view taken along a line IV-IV in
Fig. 2; and

Fig. 5 is a diagram illustrating a process for continuous
production of the diapers.

15 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Details of the disposable wearing article according to
the present invention will be more fully understood from the
description of a disposable diaper as a typical embodiment of
the invention given hereunder with reference to the
20 accompanying drawings.

Fig. 1 is a perspective view showing a disposable diaper
1 as put on a wearer's body and Fig. 2 is a partially cutaway
plan view showing the diaper 1. The illustrated disposable

diaper 1 is of open-type and has, as viewed in the plan view of Fig. 2, a transverse direction indicated by a double-headed arrow A and a longitudinal direction indicated by a double-headed arrow B. A waist-hole 15 and a pair of leg-holes 16 are formed as the diaper is put on the wearer's body. The diaper 1 presenting an hourglass-shape as viewed in the plan view of Fig. 2 comprises a holder member 5 which is elastically stretchable in the transverse direction A as well as in the longitudinal direction B and a bodily discharge receiving member 20 attached to the holder member 5. The holder member 5 comprises an elastically stretchable topsheet 2 facing the wearer's body and an elastically stretchable backsheet 3 facing wearer's clothes intermittently joined together by use of adhesive or welding technique. In the longitudinal direction B of the diaper 1, the holder member 5 has a crotch region 8, a front waist region 6 extending forward from the crotch region 8 and a rear waist region 7 extending rearward the crotch region 8. The holder member 5 further has front and rear end portions 11 extending in the transverse direction A and a pair of opposite side edge portions 13 extending in the longitudinal direction B wherein these side edge portions 13 extending in the crotch region 8 curve inward to define respective leg-surrounding lateral portions 14. Along the end portion 11 in the rear waist

region 7 and the respective leg-surrounding side edge portions 14, a waist elastic member 17 comprising a plurality of rubber threads and leg elastic members 18 each comprising a plurality of rubber threads are interposed between the top- and backsheets 2, 3 and attached to at least one of these two sheets 2, 3 in a stretched or unstretched state. The crotch region 8 of the holder member 5 is provided in its transversely middle zone with a bodily discharge receiving member 20 comprising an annular protrusion 21 and a feces receiving space 22 surrounded by the protrusion 21. The protrusion 21 lies in a zone of the crotch region 8 located aside toward the rear waist region 7 and come in contact with the wearer's body so that the protrusion 21 may properly surround an anus as the diaper 1 is put on the wearer's body.

The holder member 5 in the diaper 1 formed in this manner comprises, as seen in the plan view of Fig. 2, a zonal high elasticity segment 26 extending from a periphery of the annular protrusion 21 toward the side edge portions 13 in the front waist region 6 as well as toward the side edge portions 13 in the rear waist region 7 so as to describe a substantially X-like shape and a low elasticity segment 27 defined by the remaining segment of the cover sheet 5 except for the high elasticity segment 26. When the diaper 1 is put on the wearer's body, a higher stretching

force is necessary for the high elasticity segment 26 than a stretching force necessary for the low elasticity segment 27. The high elasticity segment 26 extends along the respective leg-surrounding lateral portions 14.

5 Such high elasticity segment 26 is formed by an elastically stretchable first sheet 28 (See Fig. 3) attached to an inner surface of the topsheet 2 as illustrated or interposed between the top- and backsheets 2, 3 and attached to at least one of these sheets 2, 3. This first elastic sheet
10 28 preferably has a stretch stress equal to or higher than those of the top- and backsheets 2, 3. It should be understood that the waist elastic member 17 as well as the leg elastic members 18 are optionally used to assist the holder member 5 to be tightly placed around the wearer's waist and thighs.

15 In the preferred holder member 5, the high elasticity segment 26 has a stretch stress of 0.25 N/15mm or higher when the segment 26 is transversely stretched by 15% and a stretch stress of 0.6 N/15mm when the high elasticity segment 26 is transversely stretched by 40%. At these stretch ratios, the
20 high elasticity segment 26 exhibits the stretch stress corresponding to at least 1.5 times of the stretch stress exhibited by the low elasticity segment 27. The holder member 5 further comprises fastener means. Specifically, each of the

opposite side edge portions 13 in the rear waist region 7 is provided with a pair of hook members 31a, 31b attached to the topsheet 2 each making one cooperating component of the mechanical fastener commonly known in the trade name of MAGIC
5 TAPE, on one hand, and each of the opposite side edge portions 13 in the front waist region 6 is provided with a pair of loop members 32a, 32b attached to the backsheet 3 each making the other cooperating component of the mechanical fastener, on the other hand. Of these mechanical fastener components, the hook
10 members 31b and/or the loop members 32b at least partially overlap the high elasticity segment 26.

Figs. 3 and 4 are partially cutaway sectional views taken along lines III-III and IV-IV in Fig. 2, respectively. The holder member 5 is formed in the transversely middle zone of
15 the crotch region 8 with a through-hole 41 extending through the top- and backsheets 2, 3 as well as the first elastic sheet 28 in a thickness-direction, that is, extending between the surface facing the wearer's body defined by the topsheet 2 and the first elastic sheet 28 and the surface facing the wearer's
20 clothes of the holder member 5. The bodily discharge receiving member 20 comprises the annular portion 51 inserted into the through-hole 41 from the surface facing the wearer's clothes of the holder member 5 to form the protrusion 21 and a bursiform

portion 52 lying on the side of the surface facing the wearer's clothes.

The annular portion 51 of the receiving member 20 has a top covering sheet 53, a bottom covering sheet 54 and filler 56 filling an inner space surrounded by these covering sheets 53, 54. A liquid-absorbent block 57 lies within the inner space of the bursiform portion 52 inside the bottom covering sheet 54. The bursiform portion 52 has an opening 52a shaped substantially in coincidence with the through-hole 41 of the holder member 5 and a peripheral edge portion 58 of the opening 52a is permanently joined to the top covering sheet 53 at a lower level of the annular portion 51 by use of adhesive or welding technique, on one hand, and releasably attached to the backsheet 3 of the holder member 5 by use of pressure-sensitive adhesive, on the other hand. If the receiving member 20 is pulled down as viewed in Fig. 3 with the bursiform portion 52 peeled off from the backsheet 3, the annular portion 51 can be elastically deformed so as to be drawn off from the through-hole 41 of the holder member 5 to separate the receiving member 20 from the holder member 5 as indicated by imaginary lines in Fig. 3.

In the holder member 5, the topsheet 2, the backsheet 3 and the first elastic sheet 28 may be formed by stock material selected from the group including an elastically stretchable

nonwoven fabric or woven fabric made of elastomer such as an urethane and a sheet material such as a film. The sheet material is preferably liquid-impervious and more preferably breathable and liquid-impervious. The holder member 5 is elastically stretchable in the direction indicated by the double-headed arrow A as well as in the direction indicated by the double-headed arrow B.

In the receiving member 20, the top covering sheet 53 of the annular portion 51 is hot formed from preferably a liquid-impervious, more preferably, breathable and liquid-impervious thermoplastic nonwoven fabric, woven fabric or a film. The filler 56 serving to make the annular portion 51 elastically compressive comprises a block of flexible and elastic foamed material such as a foamed polyurethane or pulverized powder of such block. Compressibility of the annular portion 51 may be controlled by mixing the pulverized powder of foam material preferably with thermoplastic synthetic fibers, more preferably with crimped thermoplastic synthetic fibers. The liquid-absorbent block 57 of the receiving member 20 may be formed by water-absorbent material 62 such as fluff pulp, super-absorbent polymer particles or super-absorbent polymer fiber or a mixture thereof, in every case, wrapped with a liquid-pervious sheet 63. Such liquid-absorbent block 57 may

be replaced by liquid-absorbent sheet material having an appropriate thickness such as a pulp sheet fixed to the bottom covering sheet 54 so as to form the block 57. The bursiform portion 52 of the receiving member 20 can be formed by
5 liquid-impervious film. A nonwoven fabric may be laminated on an outer surface of this film to provide the bursiform portion 52 with cloth-like touch. It is also possible to form the bursiform portion 52 by elastically stretchable film so that the bursiform portion 52 can bulge first when it receives bodily
10 discharges. When the bursiform portion 52 is made of sheet material which is not elastically stretchable, the bursiform portion 52 may be previously formed with a plurality of gathers to ensure that the bursiform portion 52 bulges first when the bursiform portion 52 receives bodily discharges.

15 With the diaper 1 configured in this manner, even when bodily discharges flow into the bursiform portion 52, it is not likely that the holder member 5 might be contaminated with bodily discharges so far as the protrusion 21 defined by the annular portion 51 is held in tight contact with the wearer's
20 body around the anus. It will be understood from Fig. 3 that the diaper 1 can be divided into the holder member 5 and the receiving member 20, so the holder member 5 may be washed to reuse it after the receiving member 20 contaminated with bodily

discharges alone has been thrown away. The diaper 1 adapted to be used in such manner can substantially reduce a unit cost of the diaper 1 by reusing the holder member 5 compared to the conventional diaper adapted to be entirely thrown away after
5 contaminated.

Fig. 5 is a diagram illustrating an example of the process for continuously making the diaper 1 shown in Fig. 2. A web 201 destined to become the top covering sheet 53 is continuously fed from upper left toward a rotary drum 200 lying at a
10 substantially central position as viewed in the diagram. In the course of being fed toward the rotary drum 200, the web 201 passes through a hot forming machine 202 in which the web is intermittently formed with concavities 203 each corresponding to the annular portion 51. The web 201 formed with the
15 concavities 203 in this manner is then introduced into a crushed powder filling box 204.

On the other hand, a suitable foamed material such as a foamed polyurethane destined to become the filler 56 is fed from upper right as viewed in the diagram toward the rotary drum 200.
20 In the course of being fed toward the rotary drum 200, the foamed material passes through a crusher 206 in which the foamed material is crushed and then introduced into a filling box 204 under air blasting from a fan 207. The web 201 having the

concavities 203 filled with the filler 56 in the filling box 204 is then combined with a web 211 destined to become the bottom covering sheet 54 fed toward the rotary drum 200 from right as viewed in the diagram so that the concavities 203 are
5 successively closed with the web 211. The web 211 has previously been coated with an adhesive by a coater 212.

The liquid-absorbent blocks 57 are intermittently fed from left to right below the rotary drum 200 as viewed in the diagram and the respective annular portions 51 cut off from the
10 webs 201, 211 bonded together are successively attached to the respective liquid-absorbent blocks 57. The respective annular portions 51 have previously been coated with an adhesive by a coater 213. The liquid-absorbent blocks 57 further run rightward as viewed in the diagram and, immediately below the
15 rotary drum 200, the bursiform portions 52 are successively attached to the respective liquid-absorbent blocks 57. Redundant peripheral margins of the respective bursiform portions 52 are trimmed by a cutter 214 and thereby the receiving members 20 are obtained. A web 216 destined to become the holder
20 members 5 is continuously fed from lower right with respect to the rotary drum 200 toward the web 216 cut into the individual holder members 5 by a cutter 217 so that these individual holder members 5 are assembled integrally with the individual

receiving members 20 on an assembly roll 218. In this manner, the diaper 1 shown in Fig. 2 is obtained.

The present invention is applicable not only to the disposable diaper illustrated and described but also to the
5 diaper having a pair of the annular portions 20 adapted to receive feces and urine, respectively. The diaper 1 according to the present invention is not limited to that for infants but includes diapers for adults and incontinent patient. The present invention can be implemented not only in the form of
10 the open-type diaper 1 as illustrated but also in the form of the pull-on disposable diaper. Furthermore, it is also possible without departing from the scope of the invention to form the holder member 5 by the topsheet 2 or the backsheet 3 alone instead of by the top- and backsheets 2, 3 and the first
15 elastic sheet 28.

The disposable wearing article according to the present invention basically comprises the holder member and the bodily discharge receiving member detachably attached to the holder member wherein the holder member is washable to be reused after
20 detached from the contaminated receiving member. Such reusability substantially reduces a unit cost of the wearing article.